

What Is Claimed Is:

1. A device for the anisotropic etching of a substrate, comprising:

a plasma source for generating a high-frequency electromagnetic alternating field;

a chamber and a reaction region for generating a plasma having reactive species inside the chamber by the effect of the alternating field on an etching gas that may be introduced into the reaction region and on a passivating gas that may be introduced into the reaction region;

an arrangement to define, in the reaction region, at least a first zone that predominantly has etching gas applied to it, and in the reaction region, at least a second zone that predominantly has passivating gas applied to it, a mixing region being provided downstream from the reaction region to intermix reactive species generated from the etching gas in the first zone and reactive species generated from the passivating gas in the second zone, with each other before acting upon the substrate;

wherein the arrangement includes an insert element that is especially cylinder-symmetrical in top view and is one of especially integrated into and mounted on top of the chamber, the arrangement including an outer wall and a cover plate through which runs at least one guiding tube that defines a passivating gas zone, the cover plate having a gas input opening allocated to the guiding tube, and the cover plate having at least one additional gas input opening, which one of leads into an interior of the insert element and is connected to at least one additional guiding tube defining an etching gas zone.

2. The device of claim 1, wherein at least one of the guiding tube and the insert element are open on their side facing the substrate and open out into the mixing region, or the insert element, on its side facing the substrate, has a floor plate having at least one gas discharge opening.

3. A device for the anisotropic etching of a substrate, comprising:

a plasma source for generating a high-frequency electromagnetic alternating field;

a chamber and a reaction region for generating a plasma having reactive species inside the chamber by the effect of the alternating field on an etching gas that may be introduced into the reaction region and on a passivating gas that may be introduced into the reaction region;

an arrangement to define, in the reaction region, at least a first zone that predominantly has etching gas applied to it, and in the reaction region, at least a second zone that has predominantly or at least almost exclusively passivating gas applied to it, and a mixing region provided downstream from the reaction region to intermix reactive species generated from the etching gas in the first zone and reactive species generated from the passivating gas in the second zone, with each other before acting upon the substrate;

wherein the arrangement includes one of: (i) at least one etching gas lance to induce, during operation, a directed gas flow of the etching gas, and at least one passivating gas lance to induce, during operation, a directed gas flow of the passivating gas; and (ii) a shower head having at least one opening for the etching gas and at least one opening for the passivating gas.

4. A method for anisotropic plasma etching of a substrate, the method comprising:

generating, with a plasma source that is configured to generate a high-frequency electromagnetic alternating field, a plasma having reactive species inside a chamber in a reaction region by the action of the alternating field upon an etching gas inserted into the reaction region and a passivating gas inserted into the reaction region;

in the reaction region, inserting the etching gas predominantly into a first zone and inserting the passivating gas predominantly into a second zone;

generating a reactive etching gas species in the first zone by using a plasma that is generated there, and generating reactive passivating gas species in the second zone by using a plasma that is generated there; and

mixing the etching gas species and the passivating gas species with each other in a mixing region downstream from the reaction region before their action upon the substrate,

wherein a quantity of the passivating gas that is used is minimized compared to a quantity of the etching gas.

5. A method for anisotropic plasma etching of a substrate, the method comprising:

generating, with a plasma source that is configured to generate a high-frequency electromagnetic alternating field, a plasma having reactive species inside a chamber in a reaction region by the action of the alternating field upon an etching gas inserted into the reaction region and a passivating gas inserted into the reaction region;

in the reaction region, inserting the etching gas predominantly into a first zone and inserting the passivating gas predominantly into a second zone;

generating a reactive etching gas species in the first zone by the use of a plasma that is generated there, and generating a reactive passivating gas species in the second zone by the use of a plasma that is generated there; and

mixing the etching gas species and the passivating gas species, with each other in a mixing region downstream from the reaction region before their action upon the substrate,

wherein at least an approximately constant proportion of energy introduced by the plasma source into the plasma is input into the passivating gas at least approximately independently of the passivating gas flow in the reaction region.